

REMARKS

Claims 16, 17, 19, 24-26, 28, 30-33, 37, 38, 41-43, 45, 50, 70 and 73-76 were considered in the Office action. Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42, 43, 45, 50, 70 and 73-76 are now pending in the above-referenced patent application. Applicants respectfully request further consideration of these claims, in view of the amendments set forth above and the following remarks.

Response To 112 Written Description Rejections

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76 stand rejected under 35 U.S.C. § 112 as allegedly failing to meet the written description requirement. Applicants traverse these rejections.

Claim 70

Claim 70 stands rejected under 35 U.S.C. §112, 1st paragraph, as allegedly containing subject matter which was not described in such a way as to reasonably convey to one of skill in the art that Applicants were in possession of the claimed invention. Specifically, the Office action states that certain aspects of the invention are broadly defined (e.g., predictor for polymerization performance), and asserts that the disclosure does not support the claimed genus or substantial portion thereof, and is therefore inadequate to show possession of the invention.

Applicants respectfully submit that claim 70 is supported by the entirety of the specification as filed. Specifically, a skilled artisan would have recognized that Applicants were in possession of the invention, as presently claimed, at the time the parent application was filed. Moreover, a person of skill in the art would have been enabled to make and use the presently-claimed invention at the time the parent application was filed.

First, Applicants submit that there is no prediction step claimed. The preamble describes the use of the invention, i.e., that the invention is a method of screening potential catalysts for polymerization performance wherein the polymerization performance of the potential catalysts is determined for at least a first monomer as a predictor for the polymerization performance of the potential catalysts for at least a second monomer. The

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

body of the claim recites the steps that are required to carry out the invention. The claim is a specific exemplification of how the steps are to be carried out.

Moreover, the specification provides substantial guidance with respect to the defining features of the invention – the larger scale work flow, including for example: reacting the potential catalysts with a first non-ethylenic monomer, and performing a second reaction with a second monomer using selected catalysts from the first reaction based on performance of the catalysts in the first reaction. In view of such guidance, and in view of the then state of the art, a person of ordinary skill would have recognized Applicants as being in possession of the invention as claimed, and would have been enabled to make and use the same.:

Accordingly, the definitive information that the invention provides about the first polymer is quite useful in this art for the planning and execution of additional screens, laboratory or commercial polymerization or copolymerization, or other necessary or desired tasks. Stated differently, the screening method of the invention—standing alone and even in the absence of further steps—provides a useful, concrete and tangible result that has practical utility to those of skill in this art.

Specification, page 11, lines 17-23.

Therefore, the instant rejection should be withdrawn.

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76 stand rejected under 35 U.S.C. §112, 1st paragraph, as allegedly containing subject matter which was not described in such a way as to reasonably convey to one of skill in the art that Applicants were in possession of the claimed invention. Specifically, the Office action states that certain aspects of the invention are broadly defined (*e.g.*, class of catalysts and monomers), and asserts that the disclosure does not support the claimed genus or substantial portion thereof, and is therefore inadequate to show possession of the invention.

The Office's Reliance on *Eli Lilly* is Misplaced

The Office's reliance on *University of California v. Eli Lilly and Co.*, ("*Eli Lilly*") is misplaced. This case is simply not controlling in connection with the facts of the instant patent application. In the *Eli Lilly* case, the claims were composition of matter claims directed to a genus of new biological compounds (*i.e.*, recombinant plasmids, or recombinant

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

microrganisms) defined primarily by biological functionality (*i.e.*, the capability of mRNA or cDNA to encode insulin). The specification at issue in the *Eli Lilly* case disclosed the protein which the cDNA compound was to encode, as well as a method for obtaining the mRNA or cDNA compounds. The specification did not, however, disclose the mRNA or cDNA compounds *per se*. A lack of written descriptive support was found since the specification did not include a description of a structure or other identifying indicia that would distinguish members of that genus, or allow the genus to be visualized or recognized by a person of skill in the art.

In the present application, unlike *Eli Lilly*, the claims are methods claims directed to novel methods for evaluating materials. Although the claimed methodologies involve the reaction of potential catalysts and monomers as steps of the method, the claimed subject matter is not the genus of catalysts or monomers as a composition of matter.

These differences are significant under the law, because method claims may require the *preparation* or *use* of certain known classes of materials by reference to the *genus* that defines such class – without having to recite multitudes of representative *species* within that genus. For example, in a case involving composition of matter claims directed to a novel catalyst and method claims directed to a particular reaction, such as catalytic dehydrogenation of alkanes using such a novel catalyst composition, the rationale of *Eli Lilly* may apply with respect to the novel catalyst, but it does not apply to the required *alkanes* that are reactants in the method.

Moreover, the Federal Circuit has repeatedly and soundly rejected broad, indiscriminate application of *Eli Lilly* as a basis for holding that methods claims lack written descriptive support. In *Amgen Inc. v. Hoechst Marion Roussel Inc.*, 65 USPQ2d 1385 (Fed. Cir. 2003), for example, the defendant challenged the validity of method claims directed toward a process for producing a particular recombinant polypeptide using vertebrate cells or in *mammalian cells* as host cells. The basis of the defendant's challenge was that the patent owner (Amgen) had failed to sufficiently describe the use of all vertebrate and mammalian cells. The court rejected this challenge. Specifically, the court reasoned that

Both *Eli Lilly* and *Enzo Biochem* (63 USPQ2d 1613, Fed. Cir. 2002) are inapposite to this case because the claim terms at issue here are not new or unknown biological materials that ordinarily skilled artisans would easily

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

miscomprehend. Instead, the claims of Amgen's patents refer to types of cells that can be used to produce recombinant human EPO. ... This difference alone sufficiently distinguishes *Eli Lilly*, because when used, as here, merely to identify types of cells (instead of undescribed previously unknown DNA sequences), the words "vertebrate" and "mammalian" readily "convey distinguishing information concerning their identity" such that one of ordinary skill in the art could "visualize or recognize the identity of the members of the genus."

(emphasis added; internal citations omitted). Thus, the court in *Amgen* held that the process claims were not invalid for failing to sufficiently describe all vertebrate and mammalian cells that that can be employed in the claimed method.

More recently in *Moba B.V. v. Diamond Automation, Inc.*, the Federal Circuit addressed the *Eli Lilly* decision in the context of an invention directed to methods for processing eggs. The court rejected a broad indiscriminate application of *Eli Lilly*, and again rearticulated the well-established standards for determining whether the written description requirement of 35 U.S.C. §112 is satisfied, to wit:

(one) should determine whether a person of skill in the art would glean from the written description... (information) sufficient to demonstrate possession of the generic scope of the claims. ...

(T)he applicant must convey, with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention.

...

The written description requirement does not require the applicant 'to describe exactly the subject matter claimed, instead the description must clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed.

(emphasis added, internal citations omitted).

The facts of the instant application are clearly in line with those of the *Amgen* and the *Moba* decisions of the Federal Circuit, and are clearly distinguished from *Eli Lilly*. Like the *Amgen* case, Applicants claims are method claims that involve the screening of potential polymerization catalysts by polymerizing the candidates with first and second monomers. Here, as in *Amgen*, the claim terms at issue are not new or unknown materials that ordinarily skilled artisans would easily miscomprehend. Instead, as in *Amgen*, the presently-pending claims refer to types of materials that can be used in connection with a process to evaluate

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

potential polymerization catalysts. This difference sufficiently distinguishes *Eli Lilly*, because here, as in *Amgen*, the terms are being used merely to identify types of materials for use in the claimed process – not to identify *undescribed, previously unknown* compounds. In short, the words “polymerization catalyst” and “monomer” readily convey distinguishing information concerning their identity such that one of ordinary skill in the art could visualize or recognize the identity of the members of the genus. The law requires nothing further.

Applicants' Invention Resides in the Required Format – Not in Novel Chemistry

Significantly, a person of ordinary skill in the art would have recognized that Applicants' invention represents new formats, approaches and protocols for screening (*e.g.*, discovering and/or optimizing) potential polymerization catalysts – generally, and without regard to particular chemistries – and as such, that the invention can readily be applied with existing, *known* chemistries. Accordingly, the uncertainties associated with chemistry and materials science (*e.g.*, as noted in the Office action) are of little, if any, relevance with respect to Applicants invention.

Applicants submit that a person of ordinary skill in the art would have appreciated that Applicants' invention defined by the claims relates to an overall work-flow that is completely general to the type of chemistries involved. That is, a skilled artisan would have recognized that Applicants invention is a general protocol for effecting a work flow for catalyst research, and is completely independent of the particular types of ligands, metal precursors, chemical diversity, and reactions. Accordingly, the concerns expressed in the Office action relating to the inherent uncertainty of chemical reactions is misplaced in this instance. Further, the asserted need for a broad range of examples that demonstrate the use of Applicants invention across a broad ranges of chemistries is likewise misplaced. In fact, it is the inherent unpredictability in the art that makes Applicants' invention particularly useful – because it provides a protocol that offers significant flexibility for a researcher to investigate catalysts in a meaningful, carefully ordered discovery or optimization research effort.

For at least these reasons, Applicants request that the rejections be withdrawn

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT**Response To Obviousness Rejection**

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over various references.

Claim 70

Claim 70 remains rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Van Tol et al. (WO 97/42232) in view of Willson (WO 97/32208). Applicants traverse the rejections on the ground that a prima facie case of obviousness has not been established because not all of the claim limitations are taught or suggested by the combination.

Van Tol is directed to a process for the polymerization of alpha-olefins. The process includes contacting at least one alpha olefin with a catalyst and a co-catalyst under polymerization conditions. Van Tol describes a specific group of catalysts, and in the examples describes a polymerization of octene using $(C_5Me_4(CH_2)_2NBu_2TiCl_2)$ as a catalyst. See *Van Tol*, pages 26-28. Van Tol also describes a polymerization of octene and 1-octadecene using a different compound – $Et(Cp(iPr)_3)NMe_2TiCl_2$ as a catalyst, *Van Tol*, page 28-31, and a polymerization of 1-octene in the presence of ethylene using yet a third catalyst – $EtCp^*NMe_2TiCl_2$. *Van Tol*, page 31.

Willson is directed to a multicell holder for assembling and testing a plurality of catalysts as cells, spots or pellets, in a variety of reactions, including polymerizations.

Claim 70 of the present invention is directed to a method for screening potential catalysts for polymerization performance for at least a second monomer, using a first monomer, and includes concurrently reacting, in an array format of potential catalysts, at least a first olefin monomer (other than ethylene), determining the polymerization performance of at least 8 different potential catalysts reacted with the first monomer in the first reaction, and polymerizing the first and second monomers as copolymers or higher-order polymers in a second reaction using one of the catalysts in the array based upon the polymerization performance of the catalyst.

It should be noted that the Office action failed to respond to many of Applicants' arguments made in the latest response in view of amended claim 70. The response to arguments appears to be a copy of the original arguments presented in rejecting the claims,

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

and discusses limitations not even in the claim and arguments not made in the latest response. Since the response failed to address Applicants' arguments, they are reiterated herein.

Both the Van Tol and Willson references fail to teach identifying olefin polymerization catalysts for further testing as required in the claim and conducting a further olefin polymerization reaction with those identified catalysts using different sets of monomers. The co-polymerizations of Van Tol (Examples II and III) involve distinctly different catalysts than the catalyst used to polymerize octene (Example I). Van Tol does not perform any additional polymerizations with other monomers using the same catalysts used to polymerize the first monomer based on the initial polymerization results, as is required in claim 70.

In the Office action, the statement in Van Tol in Example III, "This example shows that the polymerization of higher olefins is also possible in the presence of a lower olefin, such as ethylene, under effective polymerization conditions using the catalyst system of the present invention." *Van Tol, pages 31-32*, is relied upon to teach or suggest further olefin polymerization reactions as defined in the present invention. Applicants submit that this reliance is misplaced. That statement does not teach or suggest that the catalyst of Example III was either used in an earlier reaction to polymerize a first monomer or will be used in a later reaction using different monomers. That statement is merely a suggestion that maybe the catalyst family described in the reference could be used for similar co-polymerizations involving ethylene and higher olefins. This statement does not teach or suggests that the specific catalyst of Example III can be used in a second reaction involving 1-octene (a first olefin other than ethylene) and a second monomer (not ethylene, since the reaction in Example III includes ethylene and the present claims require that the second monomer not be involved in the first reaction). Instead, Van Tol is pontificating generalities based upon a single polymerization for a family of catalysts for that polymerization.

In contrast, the claims of the present invention are directed to screening methods which include reacting specific potential catalysts in a first polymerization with a first monomer and not a second monomer, evaluating the reactions, and reacting one or more of the potential catalysts with the first and second monomer in a second reaction based upon the evaluation of the first reaction. Thus, the statement of Van Tol can in no way be extrapolated to teach or suggest the methods of the presently pending claims.

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

With regards to the Office action assertion that Van Tol uses a first alpha olefin other than ethylene as a reference for evaluating further polymerizations based upon that order of the examples, Applicants respectfully disagree. There is no basis, either in law or in fact, for the conclusion that either the order of the examples suggests timing, or that the order of examples indicates a series of progressive screens. Van Tol simply attempted three different polymerizations with three different catalysts.

The Office action appears to be relying on Applicants' specification to improperly extrapolate the teachings of Van Tol, specifically asserting that the order of the examples teaches successive screening of catalysts, without proper motivation for such extrapolation.

In view of the repeated warnings by the Federal Circuit against hindsight reconstruction (*i.e.*, against finding the required motivation in the guidance of the instant specification), Applicants respectfully submit that such extrapolation is improper under the law. *See, for example, Grain Processing Corp. v. American Maize-Products Co.*, 5 USPQ2d 1788 (Fed. Cir. 1988) (stating that obviousness cannot be established by merely showing that each element of the patented products may be found somewhere in the prior art). *See also In re Vaack*, 20 USPQ2d 1438 (Fed. Cir. 1991), and *In re Dembiczak*, 50 USPQ2d, 1614 (Fed. Cir. 1999). *See also In re Kotzab*, 54 USPQ2d 1308 (Fed. Cir. 2000) (holding that an invention was not obvious, even though based on technologically simple concepts from a combination of known elements, since there was an absence of a specifically-identified understanding within the knowledge of a skilled artisan that would have motivated one to make the particular claimed invention).

Applicants also feel that additional assertions made in the Office action do not cure the deficiencies of the references.^{1 2}

¹ For example, the Office action relies upon the statement in the Abstract of Van Tol, which states "The present process for the polymerization of polymers of alpha-olefins involve contacting, under polymerization conditions, at least one α -olefin. . . with a catalyst. . ." The Office action asserts that this indicates that this statement represents a library. Even if, *arguendo*, this were considered to represent a library of polymerization catalysts, the Van Tol reference along with Willson fail to disclose or teach screening catalyst arrays in the manner recited in independent claims 16, 42 and 70.

² Furthermore, with regards to the assertion in the Office action that Van Tol is not limited to its examples and as a whole and can be extrapolatable to performing various examples in parallel, Applicants agree that the reference is not limited to its examples, but submit that this does not change the fact that Van Tol does not disclose or teach a second reaction step utilizing selected potential catalysts from the first reaction and a second monomer based upon the properties of the polymerized samples.

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

For at least these reasons, all of the pending claims are patentable over Van Tol in view of Willson.

Therefore, Applicants assert that a *prima facie* case of obviousness does not exist for the pending claims in view of the references relied upon in the Office action and request the rejection be withdrawn.

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 41-43, 45, 50, 70 and 73-76 (Lundeen and Weinberg)

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 5,236,998 to Lundeen et al. (hereafter "Lundeen") in view of U.S. Patent 6,756,195 to Weinberg et al. (hereafter "Weinberg"). Applicants traverse the rejections on the ground that a *prima facie* case of obviousness has not been established because not all of the claim limitations are taught or suggested by the combination. Claims 16, 19, 24-26, 28, 30-33, 37, 38, 41-43, 45, 50 and 70 are not obvious in light of Van Tol and Willson.

The law is clear that "to establish a *prima facie* case of obviousness, all the claim limitations must be taught or suggested by the prior art." See MPEP Sec. 2143.03; *In re Royka*, 180 USPQ 580 (CCPA 1974). As discussed below, however, technically and commercially significant features of the presently-claimed inventions are not taught or suggested by the prior art.

Lundeen is directed to a process for making a blend of polyethylene polymers. The process includes polymerizing ethylene alone in one reactor with a catalyst, polymerizing ethylene and a co-monomer in a second reactor with a catalyst, and combining the two outlet streams from the reactors in a third reactor with no catalyst where the polymerization is completed. See *Abstract*. Lundeen is not directed to screening potential polymerization catalysts for polymerization

Weinberg is directed to the synthesis, screening and characterization of organometallic compounds, such as homogeneous catalysts. Weinberg teaches a variety of reactions using arrays of organometallic materials, including polymerizations.

Generally, the claims of the present invention are directed to methods for screening potential catalysts for polymerization performance for at least a second monomer, using a first monomer, and include concurrently reacting, in an array format of potential catalysts, at least

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

a first olefin monomer (other than ethylene), evaluating the reaction, and performing a second reaction based upon the evaluation of the first reaction, the second reaction including the first and second monomers and a catalyst from the first reaction. More specifically, independent claim 16 includes determining the polymerization performance of at least 8 different potential catalysts reacted with the first monomer in the first reaction, identifying one or more catalysts from the at least 8 potential polymerization catalysts based on the polymerization performance of the catalysts in the first reaction, and reacting the one or more identified catalysts with the first and second monomers under polymerization conditions in a second reaction; independent claim 42 includes determining a property of any polymer sample or polymerization mixture made during the first reaction at a rate of one hour or less per potential catalyst, identifying one or more catalysts from the potential polymerization catalysts based on the properties of the samples from the first reaction, and reacting the one or more identified catalysts with the first and second monomers under polymerization conditions in a second reaction; and independent claim 70 includes determining the polymerization performance of at least 8 different potential catalysts reacted with the first monomer in the first reaction, and polymerizing the first and second monomers as copolymers or higher-order polymers in a second reaction using one of the catalysts in the array based upon the polymerization performance of the catalyst.

Both the Lundeen and Weinberg references fail to teach identifying olefin polymerization catalysts for further testing as required in the claims, including, for example, claims 16 and 42, and conducting a further olefin polymerization reaction with those identified catalysts using different sets of monomers. The co-polymerization and simultaneous homopolymerization of Lundeen do not involve screening of catalysts. There is no identification and further testing of one or more of a set of catalysts utilized in a first reaction. Lundeen does not perform any additional polymerizations with other monomers using the same catalysts used to polymerize the first monomer based on the initial polymerization results, as is required in independent claims 16, 42 and 70.

Contrary to the assertion by the Examiner, Lundeen does not disclose selecting one or more catalysts based on the polymerization performance of the catalyst and performing a second reaction. The Examiner asserts that the disclosure in Lundeen of performing a polymerization of ethylene in one reactor and a co-polymerization of ethylene and a co-

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

monomer in a second reactor and re-doing the polymerizations using the same monomers and catalysts but different reaction conditions, as exemplified by the examples, meets the recited elements of the claims at issue. Applicants disagree.

First, the examples in Lundeen do not perform catalyst screening as is recited in the claims. *See Specification, page 15, lines 3-7*(emphasis added):

Because the invention is most useful as a screen—*i.e.*, respectively, qualifying and eliminating respective groups of catalysts—a minimum of two or three parameters (such as catalyst composition, activator composition, ratios of components, scavengers, additives, modifiers, olefins and/or concentration) are usually considered in each array.

The present claims are directed to screening catalysts and require selecting one or more catalysts from a first reaction based on performance and reacting them in a second reaction. In Lundeen, the catalysts are not evaluated or screened. They are used in every reaction with other parameters being varied. It is not even disclosed that the variations are a screen or an optimization. The examples are merely variations on the polymerization process to show the scope of the invention in Lundeen. There is no basis to conclude that the examples have a timely order in them to signify screening or optimization. Lundeen is simply directed to forming a polymer blend by performing two polymerizations in parallel and combining the products.

Applicants further submit that Weinberg does not cure Lundeen's deficiencies. Weinberg does not teach or suggest screening polymerization catalysts in the manner as claimed in the present invention.

Inadequate Motivation / Reasoning of OA not Sufficient

Alternatively, and independent of the aforementioned deficiencies, there is no motivation existing in the art that would have led a skilled artisan to combine the teaching of the various references in a manner that would have led to the claimed inventions. The reasoning set forth in the Office action is inadequate with respect to the rejection, and as such, the Office action fails to establish a *prima facie* case of obviousness. There is no motivation in Lundeen for catalyst screening. Lundeen discloses a process for blending two polymerization products. The suggestion to screen a library of 8 catalysts using the teachings of Lundeen is

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENT

inappropriate. The Office action is merely taking elements from unrelated references and combining them to arrive at Applicants' invention.

In view of the lack of motivation and other deficiencies noted above, the Office action appears to be relying on Applicants' specification to improperly extrapolate the teachings of Lundeen, and to improperly combine the teachings of Lundeen with arbitrarily selected portions of other references – without proper motivation for such extrapolation and combination existing in the prior art.

In view of the repeated warnings by the Federal Circuit against hindsight reconstruction (*i.e.*, against finding the required motivation in the guidance of the instant specification), Applicants respectfully submit that such extrapolation is improper under the law. *See, for example, Grain Processing Corp. v. American Maize-Products Co.*, 5 USPQ2d 1788 (Fed. Cir. 1988) (stating that obviousness cannot be established by merely showing that each element of the patented products may be found somewhere in the prior art). *See also In re Vaack*, 20 USPQ2d 1438 (Fed. Cir. 1991), and *In re Dembiczak*, 50 USPQ2d, 1614 (Fed. Cir. 1999). *See also In re Kotzab*, 54 USPQ2d 1308 (Fed. Cir. 2000) (holding that an invention was not obvious, even though based on technologically simple concepts from a combination of known elements, since there was an absence of a specifically-identified understanding within the knowledge of a skilled artisan that would have motivated one to make the particular claimed invention).

For at least these reasons, Applicants request the rejections be withdrawn.

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 41-43, 45, 50, 70 and 73-76 (Van Tol, Willson and Weinberg)

Claims 16, 19, 24-26, 28, 30-33, 37, 38, 42-43, 45, 50, 70 and 73-76 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Van Tol, Willson and Weinberg. Tol. The same arguments discussed above apply to this rejection. Van Tol fails to recite specific elements of the claims, which Willson and Weinberg fail to provide. None of the references alone or in combination recite the screening methods as claimed.

Applicants request the rejections be withdrawn.

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE
PATENTCONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

The Examiner is hereby authorized to charge the fees required in connection with this Amendment F to Deposit Account No. 50-0496, in accordance with the Transmittal submitted herewith. The Examiner is also authorized to debit any other fees required in connection with this application, or to credit any overpayment of fees in connection with this application to Deposit Account No. 50-0496.

Respectfully submitted,

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